**Biotech DA**

**Notes**

Not biotech bad but “U.S. biotech leadership bad --- this can be a net benefit to an international counter plan

I am not including defense to the pesticides impact --- think of some logical answers

**1nc Biotech DA**

**U.S. biotech leadership is eroding now because of a lack of innovation**

**Cummings 12**, Deborah Cummings is a senior program manager with Battelle, What will it take for the U.S. to maintain its global leadership in the biopharmaceutical industry?, http://www.biotech-now.org/business-and-investments/2012/10/what-will-it-take-for-the-u-s-to-maintain-its-global-leadership-in-the-biopharmaceutical-industry#

**It is becoming clear**, however, that **the U.S. can no longer take its leadership in biopharmaceuticals** or other knowledge-based industries **for granted**. As noted by President Barack Obama, “A half century ago, this nation made a commitment to lead the world in scientific and technological innovation; to invest in education, in research, in engineering; to set a goal of reaching space and engaging every citizen in that historic mission … [**O]ther countries are** now **beginning to pull ahead** in the pursuit of this generation’s great discoveries.”[ii] For the first time, **U.S. economic leadership is being challenged by international competitors who are increasingly competing on the basis of technological innovation** and scientific talent.

**Ocean exploration revitalizes biotech – it’s the new frontier**

**EC 14**, European Commission, **Exploring** the depths of **the ocean – the new frontier in biotechnology,** http://ec.europa.eu/programmes/horizon2020/en/news/exploring-depths-ocean-%E2%80%93-new-frontier-biotechnology

The **research** team **is extending** the **frontiers of our capabilities, making it possible to harvest the vast resources offered by the enzymes, proteins and other molecules contained in the microbial life** which exists **in the harshest marine environments** – at the extremes of heat, cold, pressure and salinity. The highly adapted cellular machinery required to survive in these extreme conditions is the reason these organisms are of special interest. The molecules they contain are likely to have properties not found in organisms existing in more common habitats.

“**Microbes have a great potential for biotechnology**,” says MAMBA’s Project Coordinator, Professor Peter Golyshin of Bangor University in the United Kingdom. “Micro-organisms have been found to be particularly suitable for production of compounds with anti-inflammatory, anti-bacterial, anti-fungal, cholesterol-lowering and anti-cancer activity, as well as enzymes applicable in the food, cosmetics and pharmaceuticals industries.”

**U.S. lead shatters global adoption of biotech – nothing else is more destructive**

**Taylor 3**, Michael R. Taylor is a senior fellow at Resources for the Future, Rethinking US leadership in food biotechnology, http://www.nature.com/nbt/journal/v21/n8/full/nbt0803-852.html

**The U**nited **S**tates **and** the **major US agbiotech companies** have **positioned themselves in the eyes of many as opposing choice by virtue of their aggressive promotion of the technology, their opposition to labeling worldwide, and most recently by resorting to trade remedies to force Europe's hand. Nothing could be more destructive of trust in the technology and its promoters than for them to be on the wrong side of the choice issue. They should change their position and put themselves on the side of empowering choice in whatever way works in any** given **country**.

**This backlash destroys global biotech development – only biotech solves food scarcity**

**Taylor 3**, Michael R. Taylor is a senior fellow at Resources for the Future, Rethinking US leadership in food biotechnology, http://www.nature.com/nbt/journal/v21/n8/full/nbt0803-852.html

It's fine to support and promote agricultural biotechnology on its scientific merits, but the **public reaction to biotechnology—in America, Europe, and Africa—has only a little to do with science**. Good science makes biotechnology possible and contributes to answering some of the questions people have, but **no amount of science or science education will suffice to achieve public acceptance**. US proponents of biotechnology, inside and outside government, need to embrace and address the social dimension of biotechnology acceptance.

**The stakes in this debate are high. Biotechnology is helping US farmers grow corn, cotton and soybeans more efficiently and**, in some cases, **with less use of toxic insecticides, but the worldwide pattern of controversy, resistance and polarization surrounding biotechnology threatens its future adoption for food purposes, in the U**nited **S**tates **and elsewhere**. Wheat growers and processors alike are cautioning Monsanto not to proceed with a GM version of this staple crop until global public acceptance improves.

This **resistance has economic consequences for tech**nology **developers and** for **US farmers, but resistance to food biotechnology has much broader social consequences if it blocks adoption of the technology to help solve the drought, pest, plant disease and other productivity-limiting problems that plague farmers in Africa.**

Gordon Conway, the president of The Rockefeller Foundation, believes **biotechnology can help bring a 'doubly green' revolution to African farmers**, who were largely bypassed by the first green revolution. **This means achieving desperately needed productivity gains at much lower environmental cost in the form of pesticide pollution** and **water and energy use. By splicing genes in, modern biotechnology can put the valuable agronomic performance trait inside the plant rather than having to manipulate the environment outside the plant.**

**Food shortages collapse civilization --- causes disease spread, terrorism, and economic collapse**

**Brown, 9** --- founder of both the WorldWatch Institute and the Earth Policy Institute (May 2009, Lester R., Scientific American, “Could Food Shortages Bring Down Civilization?” Ebsco)

**The biggest threat to global stability is the potential for food crises** in poor countries **to cause government collapse**. Those crises are brought on by ever worsening environmental degradation

One of the toughest things for people to do is to anticipate sudden change. Typically we project the future by extrapolating from trends in the past. Much of the time this approach works well. But sometimes it fails spectacularly, and people are simply blindsided by events such as today's economic crisis.

For most of us, the idea that civilization itself could disintegrate probably seems preposterous. Who would not find it hard to think seriously about such a complete departure from what we expect of ordinary life? What evidence could make us heed a warning so dire--and how would we go about responding to it? We are so inured to a long list of highly unlikely catastrophes that we are virtually programmed to dismiss them all with a wave of the hand: Sure, our civilization might devolve into chaos--and Earth might collide with an asteroid, too!

**For many years I have studied global agricultural, population, environmental and economic trends and their interactions. The combined effects of those trends and the political tensions they generate point to the breakdown of governments and societies.** Yet I, too, have resisted the idea that **food shortages could bring down** not only individual governments but also **our global civilization**.

I can no longer ignore that risk. Our continuing failure to deal with the environmental declines that are undermining the world food economy--most important, falling water tables, eroding soils and rising temperatures--forces me to conclude that such a collapse is possible.

The Problem of Failed States

**Even a cursory look at the vital signs of our current world order lends unwelcome support to my conclusion.** And those of us in the environmental field are well into our third decade of charting trends of environmental decline without seeing any significant effort to reverse a single one.

In six of the past nine years **world grain production has fallen short of consumption**, forcing a steady drawdown in stocks. When the 2008 harvest began, world carryover stocks of grain (the amount in the bin when the new harvest begins) were at 62 days of consumption, a near record low. In response, world grain prices in the spring and summer of last year climbed to the highest level ever.

**As demand for food rises faster than supplies are growing, the resulting food-price inflation puts severe stress on the governments of countries already teetering on the edge of chaos. Unable to buy grain or grow their own, hungry people take to the streets.** Indeed, even before the steep climb in grain prices in 2008, the number of failing states was expanding [see sidebar at left]. Many of their problem's stem from a failure to slow the growth of their populations. But **if the food situation continues to deteriorate, entire nations will break down at an ever increasing rate**. We have entered a new era in geopolitics. **In the 20th century the main threat to international security was superpower conflict; today it is failing states.** It is not the concentration of power but its absence that puts us at risk.

**States fail when national governments can no longer provide** personal security, **food security** and basic social services such as education and health care. They often lose control of part or all of their territory. When governments lose their monopoly on power, law and order begin to disintegrate. After a point, countries can become so dangerous that food relief workers are no longer safe and their programs are halted; in Somalia and Afghanistan, deteriorating conditions have already put such programs in jeopardy.

**Failing states are of international concern because they are a source of terrorists, drugs, weapons and refugees, threatening political stability everywhere.** Somalia, number one on the 2008 list of failing states, has become a base for piracy. Iraq, number five, is a hotbed for terrorist training. Afghanistan, number seven, is the world's leading supplier of heroin. Following the massive genocide of 1994 in Rwanda, refugees from that troubled state, thousands of armed soldiers among them, helped to destabilize neighboring Democratic Republic of the Congo (number six).

**Our global civilization depends on a functioning network of politically healthy nation-states to control the spread of infectious disease, to manage the international monetary system, to control international terrorism and to reach scores of other common goals. If the system for controlling infectious diseases**--such as polio, SARS or avian flu--breaks down, **humanity will be in trouble. Once states fail, no one assumes responsibility for their debt to outside lenders. If enough states disintegrate, their fall will threaten the stability of global civilization itself.**

**2nc Impact Run**

**Biotech solves Amazon deforestation, food shortages, and pesticides**

**McGloughlin 2K,** Martina McGloughlin is a professor @ UC Davis, Journal of Agrobiotechnology Management, Ten Reasons Why Biotechnology Will Be Important to the Developing World, <http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm>

**Biotechnology companies, national and international organizations,** including the Consultative Group on International Agricultural Research (CGIAR), and numerous academics (e.g., Ruttan 1999) have **continued to argue for the need to increase agricultural productivity so that sufficient food supplies exist to meet the demand forthcoming from a swelling world population**. Despite Altieri and Rosset's (this issue) assertion, population density is hardly the issue. **In the absence of significant productivity gains,** or expansion of agriculture into marginal lands (e.g., forests), **there will be not be sufficient food quantities to feed the projected levels of population**. This simple reality is independent of income distribution or the location of the population. And hardly anyone, including Altieri and Rosset, will argue about the pragmatism of population projections. So **in the absence of a good alternative—and in the face of a proven slow down in the productivity gains from the Green Revolution—biotechnology is by default our best, and maybe, only, way to increase production to meet future food needs.**¶ My objective in this article is to challenge misconceptions often put forward about biotechnology. Within this context I challenge many of Altieri and Rosset's arguments which are not generally supported by existing scientific evidence. I follow their numbering of arguments to facilitate point-by-point comparisons.¶ The argument that hunger is a complex socioeconomic phenomenon, tied to lack of resources to grow or buy food, is correct. Equally correct is the argument that existing food supplies could adequately feed the world population. But how food and other resources (e.g., land, capital) are distributed among individuals, regions, or the various nations is determined by the complex interaction of market forces and institutions around the world. Unless our civic societies can come up quickly with an economic system that allocates resources more equitably *and* more efficiently than the present one, 50 years from now we will be faced with an even greater challenge. Calorie for calorie there will not be enough food to feed the projected population of about 9 billion. With the purchasing power and wealth concentrated in the developed countries, and over 90 percent of the projected population growth likely to occur in developing and emerging economies, it is not difficult to predict where food shortages will occur. **Unless we are ready to accept starvation, or place parks and the Amazon Basin under the plough, there really is only one good alternative**: discover ways to increase food production from existing resources. Bottom line, Altieri and Rosset may want to argue against Western-style capitalism and market institutions if they so choose to—but their argument is hardly relevant to the issue of biotechnology.¶ The assertion that most innovations in biotechnology are *not* need driven is incorrect. Here are a few well-documented examples of biotechnology innovations targeting pressing needs:¶ Development of a rice strain that has the potential to prevent blindness in millions of children whose diets are deficient in Vitamin A. Vitamin A is a highly essential micronutrient and widespread dietary deficiency of this vitamin in rice-eating Asian countries has tragic undertones: five million children in South East Asia develop an eye disease called xerophthalmia every year, and 250,000 of them eventually become blind. Improved vitamin A nutrition would alleviate this serious health problem and, according to United Nations Children's Fund (UNICEF), could also prevent up to two million infant deaths because vitamin A deficiency predisposes them to diarrhea diseases and measles. A research team led by Ingo Potrykus of the Swiss Federal Institute of Technology in Zurich, in collaboration with scientists from the University of Freiburg in Germany have succeeded in producing the precursor to this vitamin, beta-carotene in rice ([Potrykus, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R19)).¶ **Development of rice strains with increased iron content and lowered anti-nutrients. Approximately 30% of the world's population suffers from iron deficiency**, especially in less developed countries. Anemia characterized by low hemoglobin is the most widely recognized symptom of iron deficiency, but there are other serious problems such as impaired learning ability in children, increased susceptibility to infection and reduced work capacity. An adequate supply of iron is crucial during the first two years of life because of rapid body growth. Yet the body can use less than 20% of ingested iron. Most iron found in the soil is in the ferric state, an ionic form that can not be utilized until it is converted to the ferrous form. Plants can convert ferric to ferrous iron, however, humans lack the enzyme needed for such conversion. One approach to treating iron deficiency in people is to create plants that contain more iron. The gene for ferritin, an iron-rich soybean storage protein, has been introduced into rice under the control of an endosperm-specific promoter. Grains from transgenic rice plants contained three times more iron than normal rice. The bioavailability of the mineral has been increased also through biotechnology. Seeds store the phosphorous needed for germination in the form of phytate, which is an anti-nutrient because it strongly chelates iron, calcium, zinc and other divalent mineral ions, making them unavailable for uptake. The same Swiss group that created beta-carotene rice has developed a series of transgenic rice lines designed to deal with this problem by introducing a gene that encodes phytase, an enzyme that breaks down phytate. In addition, sulfur containing proteins enhance iron reabsorption so to further promote the reabsorption of iron, a gene for a cystein-rich metallothionein-like protein has also been engineered into rice by Potrykus ([Goto *et al.*, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R10); [Potrykus, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R19)).¶ Improvements to hybrid rice by introducing the gene of interest directly into maintainer or restorer lines. Early results at transforming rice with the nodulin gene indicate that this staple can be colonized by bacteria that fix nitrogen from the atmosphere. This would improve productivity in the absence of synthetic fertilizers, which are typically unavailable to resource-poor farmers in less developing countries (LDCs) ([Dowling, 1998](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R5)).¶ Edible vaccines, delivered in locally grown crops, could do more to eliminate disease than the Red Cross, missionaries, and United Nations (UN) task forces combined, at a fraction of the cost ([Arakawa *et al.*, 1998](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R2); [Tacket *et al.*, 1998](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R24); [Hag *et al.*, 1995](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R12)).¶ All these and numerous other technologies are being advanced and directed towards resource-poor farmers and locations.¶ Biotechnology is being advanced and directed towards resource-poor farmers and locations. Altieri and Rosset ignore the substantial technology pipeline and the efforts of thousands of scientists across the world to safeguard food safety and improve human nutrition and quality of life. They prefer to focus exclusively on the earliest biotechnology products that were broadly commercialized Bt (*Bacillus thuringiensis)*and Roundup Ready technologies. Equally absent in Altieri and Rosset's arguments is an elementary understanding of market-economics and innovation dynamics.¶ In market-driven economies, need and profit are closely connected. Companies, large and small, profit only when they offer products and services that address needs and induce willingness to pay. Bt and Roundup Ready technologies have been adopted faster than any other agricultural innovation on record ([Kalaitzandonakes, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R13)). These adoption levels have taken place despite abundant supplies of conventional seed with which farmers can exercise their "age-old right to save and replant." The reason for the quick adoption, of course, is that farmers profit from the use of such technologies through reduced chemical sprays, improved yields, labor savings, shifts to reduced tillage systems and other benefits ([Maagd, *et al.* 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R16); [Abelson & Hines, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R1)). Over half of all economic benefits generated by these technologies have gone to farmers, more than what has been appropriated by biotechnology and seed companies combined ([Traxler & Falk-Zepeda, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R28); [Falk-Zepeda, Traxler, & Nelson, *in press*](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R8)).¶ **The argument that the integration of chemical pesticides and seed-use has led to lower returns for farmers is incorrect.** To support their argument Altieri and Rosset reference an obscure manuscript while they ignore several comprehensive studies that point to increased net returns and reduced chemical loads ([Rice, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R20); [Klotz-Ingram *et al.*, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R14); [Falk-Zepeda, Traxler, & Nelson, *in press*](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R8); [Gianessi, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R11); [Abelson & Hines, 1999](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R1); [USDA/ERS, 1999a](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R29), [1999b](http://www.agbioforum.org/v2n34/v2n34a04-mcgloughlin.htm#R30)).¶ **Because of their improved production economics, the introduction of Bt- and herbicide resistant crops have forced tremendous competition in herbicide and insecticide markets. Prices of many herbicides and insecticides have been slashed by over 50% in these markets** in order to compete with the improved economics of biotechnology seed/chemical solutions. Such price reductions have led to significant discounting of weed and insect control programs and have benefited even farmers who have not adopted biotechnology crops. **Because of lower prices and reduced volumes synthetic pesticides from the use of biotechnology crops, the agrichemicals sector has experienced significant financial losses over the last two-three years**.¶ There is ample evidence to suggest that Altieri and Rosset's assertion that "the integration of seed and chemical industries appears destined to (deliver) lower returns" is incorrect. What is surprising, however, is the lack of rudimentary understanding of farm economics and decision making. **Why would thousands of farmers adopt technologies that lead them to losses year after year while conventional seed and pesticide solutions are readily available and cheaper than before the introduction of biotechnology crops?**

**Amazon deforestation risks extinction**

**AIRR 2K** Amazon International Rainforest Reserve 00 ["The Amazon Stands As A Wonderous Testimony To Its Glorious Creator," [www.amazonrainforest.org/community/articles/article2.asp](http://www.amazonrainforest.org/community/articles/article2.asp) Waldman]

**The Amazon Rainforest, the largest and richest ecosystem on earth, has stood inviolate for thousands if not milions of years since its creation. The profusion and variety of life forms present in the rainforest and its critical role in supplying the world with air** has resulted in its being called the "Heart and Lungs" of the planet. Indeed, **the majority of the world's oxygen is supplied by its dense foliage and teeming plant life** which upon first inspection, seems boundless and industructible. A recent study by the Smithsonian Institute indicates that about **90% of all the plant and animal species existant in the world today reside in the Amazon Rainforst and depend upon its complex ecology.** Unlike the forests of temperate zones that are populated by stands of a single or double species of tree, the tropical rainforest will in a two and half acre plot harbor as many as 283 tree species. With certain trees growing to a height of 150 ft. or more, the rainforest is mulitleveled with an emergent tree level, upper and lower canopy and understory. Each level harbors a particular constellation of plant and animal life. Human beings have only begun to catalog and name the creatures that live here. Home to thousands of varieties of flowering plants, the rainforest supports endless varieties of hummingbirds, butterflies and insects such as the rhinocerous beetle and the army ant. It is also home to the spider monkey, pink and gray dolphins, Amazon river otter, piranha, anaconda, jaguar, blue and yellow macaw, toucan, harpy eagle, fishing bat, tapir sloth, tarantula, caymen crocidile, manatee, etc. In addition to serving as the "Heart and Lungs" of the planet, **the Amazon Rainforest constitutes the world's largest "pharmacy"** yielding thousands of previously unknown substances found no where else. Compounds from tropical flora relieve headaches, help treat glaucoma and provide muscle relaxants used during surgery. **The Amazon Rainforest has also yielded quinine for the treatment of malaria and periwinkle for the treatment of leukemia. Given the rainforest's teeming biological diversity, its value to humanity as a laboratory of natural phenomena and as a medical storehouse is priceless. Conversely, if the rainforest disappears, researchers fear that plants with wonder-drug potential will be lost forever**. In addition to these functions, the Amazon Rainforest attracts huge volumes of precipitation from the Atlantic ocean, releasing it in endless cycles of rain and tropical downpours that give the rainforest its name. Averaging from 80 to 120 inches annually, **the Amazon Rainforest channels and provides drainage for the Amazon River, the world's largest river and source of 25% of the world's fresh water supply**. Moreover, the rainforest is home to some one hundred thousand Indian people, the remnant of innumerable tribes which have held out against the ravages of five hundred years of conquest and colonization by Europeans. Since Europeans first appeared in Brazil, nearly 90% of Amazonian Indian people have disappeared. In the last ten years alone, the Yanomani Indian homeland has been reduced by government decree from 36,000 to 800 square miles in response to an invasion of 45,000 gold prospectors into their territory. When the invasion began, there were about 9000 Yanomani. Today they are dying in large numbers from tuberculosis, hepatitis, malaria and venereal disease. Like the rainforest itself, its indigenous inhabitants offer something unique to the world, for they are the repository of an ancient, intimate and all encompassing understanding of the natural world of which they are a part. With the loss of the rainforest and its original inhabitants, humankind loses a unique and valuable organ for knowing itself and its ecosystems. As an example, the Yanomani, the largest group of unassimilated Indians in Brazil, speak a language unrelated to any other spoken in the Amazon basin or anywhere else on earth. Their world view is synonymous with the Rainforest itself. As the greatest repository of nature's treasures and most significant source of air, the Amazon Rainforest is crucial to the survival of all life on the planet and to human beings' understanding of their place in the web of life. In the words of Guatama Buddha, "**The forest is a peculiar organism of unlimited kindness and benevolence that makes no demands for its sustenance and extends generously, the products of its like and activity. It affords protection to** **all living beings."**

**Pesticides cause extinction**

**WDP 97—**Western Daily Press, 10/6/1997. “Diana's gone all sari-eyed,” Lexis.

For new research claims that PMT - which is supposed to be due to drops in oestrogen levels - is a myth, it's all in the mind, just an excuse used by women when they have those perfectly normal random bouts of depression or irritability which men get too. Only men don't have a convenient hormonal syndrome they can blame. **Oestrogen** is clearly tricky stuff, for elsewhere, **scientists are blaming it for** the **potential extinction** of mankind**. Oestrogen in** the atmosphere - and the **industrial chemicals and pesticides** which mimic it - **are**, they say, **causing** increases in cancer and dramatic **drops in fertility** in males of many species, including humans**. It could,** indeed, **wipe out the human race**. We don't dispute the way high levels of testosterone can affect males, so how come people are so eager to deny that similar changes in oestrogen levels can make us women a bit tetchy at times? Surely if **it's powerful enough to** **result in the destruction of planetary life**, it's not unreasonable to think oestrogen might also cause a teensy- weensy bit of disturbance in women now and again?

**2nc Impact --- Bioterror**

**Biotech solves bioterror – that outweighs nuclear war**

**Maurer 7** [Stephen M. Maurer, J.D.](http://violet.berkeley.edu/%7Egspp/iths/maurercv.htm) Director of the [Goldman School Project](http://gspp.berkeley.edu/index.html) at the [University of California, Berkeley](http://www.berkeley.edu/) on [Information Technology and Homeland Security](http://gspp.berkeley.edu/academics/affiliates/maurer.html) Lifeboat Foundation BioShield http://lifeboat.com/ex/bio.shield 2007

**The new realities of terrorism** and suicide bombers **pull us one step further. How would we react to the devastation caused by a virus or bacterium or other pathogen unleashed** not by the forces of nature, but intentionally **by man? No** intelligence **agency, no matter how astute**, and no military, no matter how powerful and dedicated**, can assure that a small terrorist group using readily available equipment in a small and apparently innocuous setting cannot mount a first-order biological attack. With the rapid advancements in technology, we are rapidly moving from having to worry about state-based biological programs to smaller terrorist-based biological programs. It's possible today to synthesize virulent pathogens from scratch, or to engineer and manufacture** [**prions**](http://en.wikipedia.org/wiki/Prions) **that, introduced undetectably over time into a nation's food supply, would after a long delay afflict millions with a terrible and often fatal disease. It's a new world.  Though not as initially dramatic as a nuclear blast, biological warfare is potentially far more destructive than the kind of nuclear attack feasible at the operational level of the terrorist.** And biological war is itself distressingly easy to wage. It would be more cost effective if those funding the BioShield set specific goals and gave prize money to the people/organizations that accomplished them than simply funding research without such goals.  We propose that we take the measure of this threat and make preparations today to engage it with the force and knowledge adequate to throw it back wherever and however it may strike. It is time to accelerate the development of antiviral and antibacterial **technology for the human population. The way to combat this serious and ever-growing threat is to develop broad tools to destroy viruses and bacteria.** We have tools such as those based on RNA interference that can block gene expression. We can now sequence the genes of a new virus in a matter of days, so **our goal is within reach! We call for the creation of new technologies and the enhancement of existing technologies to increase our abilities to detect, identify, and model any emerging or newly identified infective agent, present or future, natural or otherwise — we need to accelerate the expansion of our capacity to engineer vaccines for immunization, and explore the feasibility of other medicinals to cure or circumvent infections, and to manufacture, distribute, and administer what we need in a timely and effective manner that protects us all from the threat of bioengineered malevolent viruses and microbial organisms. Time is running out.**

**2nc Turns Warming**

**Biotech solves warming**

**Parikh 6** President and CEO of StratumOne Communications handling intellectual property issues involving 2/23/6, European Commission DG Environment News Alert, Using Biotechnology Against Global Warming

**Reducing the rate of global climate change induced by growing levels of [GHG’s] greenhouse gases in the atmosphere is recognised as the world's greatest environmental challenge. In parallel with the efforts concentrated on reducing the levels of CO2 from anthropogenic sources, scientists are increasingly exploring the important role technology can play in effectively managing the long-term risks of climate change**. In particular, researchers are focusing on several possible ways in which **biotechnology might help to both reduce the emissions of CO2 in the air, and sequester more carbon from the air into the ground and oceans**. In a recently completed research, **American scientists have discovered a more efficient variant of the key enzyme involved in CO2 sequestration by plants during photosynthesis, the** ribulose 1,5bisphosphate carboxylase/oxygenase (**RuBisCO**). The main aim of the study was to direct the evolution of RuBisCO variants with improved kinetic and biophysical properties that could enable plants to use and convert CO2 more efficiently. Previous scientific attempts of engineering more efficient RuBisCo enzymes were primarily focused on mutating specific amino acids within RuBisCo and then seeing if the change affected CO2 conversion. In this study, the researchers used a different approach which consisted in inserting randomly mutating RuBisCO genes into bacteria (in this case Escherichia coli) and screening for the most efficient resulting RuBisCO enzymes. In nature, E. coli bacteria do not carry the RuBisCO enzyme and they do not effectuate photosynthesis nor do they contribute to the carbon sequestration from the atmosphere. **The researchers thus isolated genes encoding RuBisCO and a helper enzyme from photosynthetic bacteria and added them to E. coli. Such genetically modified E. coli were able to fix and convert CO2 into consumable energy when the other nutrients were withhold and the bacteria relied on RuBisCO and carbon dioxide to survive under these stringent conditions**. Subsequently the RuBisCO gene was randomly mutated, and these mutant genes were inserted to E. coli. **The fastest growing strains carried mutated RuBisCO genes that produced a larger quantity of the enzyme, leading to faster assimilation of carbon dioxide gas.** The RuBisCO variants that evolved during three rounds of such random mutagenesis and selection were over-expressed, and exhibited 5fold improvement in specific activity relative to the wild-type enzyme. According to the scientists, **such large changes in RuBisCO efficiency could potentially lead to a faster plant growth, quicker sequestration of the CO2 from the air and more efficient plant removal of [GHG’s] greenhouse gasses from the atmosphere.**

**2nc AT: Competitiveness Impact Turn**

**Economies among nations aren’t zero-sum – competitiveness theory is a flawed metric for evaluating macro-economic trends**

**Wilson 08** (James Wilson, Basque Inst. of Competitiveness ‘8 “Territorial Competitiveness and Development Policy” [http://www.tips.org.za/files/Wilson\_James\_Paper.pdf p. 7](http://www.tips.org.za/files/Wilson_James_Paper.pdf%20p.%207))

**Three central inter-related issues are evident in the dominant, yet contested, policy discourse on competitiveness.** First of all, **there is discomfort among many with the explicit notion of territories ‘winning’ or ‘losing’ associated with the language of competitiveness**; **secondly, there is a fundamental question regarding what objectives ‘places’ are actually trying to attain in their quest to be competitive**; thirdly, there must follow a concern with how (and by who) these objectives are determined. **Schoenberger** (1998) **provides an interesting departure point for the first of these. She argues that the competitiveness discourse has two sources from which it takes its power.** Firstly, **it is rooted in orthodox economics, in which the market ultimately judges behaviour**; thus “competitiveness simply describes the result of responding correctly to market signals” (3), and “becomes inescapably associated with ideas of fitness and unfitness ... ‘deserving to live’ and ‘deserving to die’” (4). Secondly, it is rooted in the business community. Here the term competitiveness is “an essential value and an essential validation” (4), used as an explanation for any strategic action, without which the firm will lose out to competitors and ultimately die. **Thus competitiveness is deeply rooted in a dialogue of success and failure, existence and extinction**, and **by implication direct win-lose competition.** This explains in part the concerns of authors such as Krugman, where **critique of analysis of national competitiveness is founded on the argument that trade is not a zero-sum game.**13 In this context **an obsession with ‘winning’ in a process of direct competition carries a risk of over-encouraging often ill-informed protectionist or strategic trade policies in a form of mercantilism.** Alongside is a suggestion that **the language is inappropriate because countries cannot go out of business**; **they don’t suffer the ultimate sanction of extinction if they ‘lose’.** However, while **the theoretical basis for these arguments may be sound in terms of a macroeconomic analysis of national trade**, Camagni (2002) suggests that they cannot be extended to the regional level of analysis. He points to ongoing debate among regional scientists in response to Krugman’s comments, and argues that a key difference is that cities and regions compete on the basis of absolute advantage rather than comparative advantage. The absence of effective automatic adjustment mechanisms in the form of price-wage flexibility and exchange rates, alongside the existence of the “more effective and punishing mechanism” of the inter-regional migration of capital and labour, implies that “a region can well be pushed ‘out of business’ if the efficiency of all its sectors are lower than those of other regions” (Camagni: 2401-2402).14 While physically ceasing to exist is obviously not a possibility, these features of regional economic interaction mean that regions in effect risk long-term decline and exclusion if they cannot ‘compete’ directly with others.

**Competitiveness theory wrong – offers a poor framework for policymakers to follow**

**Wilson 08** (James Wilson, Basque Inst. of Competitiveness ‘8 “Territorial Competitiveness and Development Policy” http://www.tips.org.za/files/Wilson\_James\_Paper.pdf p. 7)

**Use of the concept of competitiveness in economic policy circles has** subsequently **seen an explosion**, with Porter’s framework developed with respect to smaller geographical units of analysis, including cities and regions (Porter, 1995, 2003). Moreover, given its origins, **the popularity of the discourse of competitiveness has encouraged a stress on direct rivalry between territories in economic development processes** (Malecki, 2004). Thus Fagerberg (1996, 48, emphasis added) suggests that “a consensus definition of international competitiveness might perhaps be that it reflects the ability of a country to secure a high standard of living for its citizens, relative to the citizens of other countries, now and in the future.” Furthermore, Bristow (2005: 287) argues that “along with other prominent commentators such as Robert Reich and Lester Thurow, Porter has made a powerful contribution to the sedimentation of the idea that places are equivalent to corporations, competing for market share within an increasingly interconnected and fiercely competitive global economy”. More generally such a perspective has strong links with aspects of the debate surrounding the changing role of the State as processes of globalisation have accelerated (Radice, 2000; Sugden and Wilson, 2005). Authors such as Ohmae (1995), Storper (1997) and Scott (1998), for example, have been influential in emphasising regions as basic economic units in an increasingly globalised world, and trends in globalisation have helped fuel a burgeoning literature in regional studies.10 **Within these debates the concept of territorial competitiveness continues to play a pivota**l, though **contested, role**. While analysis of territorial competitiveness has proved extremely attractive for many policy analysts and practitioners, reflected for example in wide adoption of the terminology and core principles of Porter’s approach, **it has raised concerns in different parts of the academic literature.** In general the **variability in quality of analyses is noted: “serious analyses as well as ideological tracts, low-level business school reports, banal data churning, applications of impressive but vacuous formulae, and straightforward ‘bashing-the-foreigner’”** (Lall, 2001a: 2). More specifically, **criticism has been aimed directly at Porter’s framework and its impacts on policy. Davies and Ellis** (2000), for example, **review various critiques in identifying a series of specific weaknesses and suggest that “policy-makers are left with a ‘laundry list’ on which to base simple SWOT-type analyses of their economies, but there is no reliable guide to policy”.** Reflective of the distance between the economics and business literatures, **Lall (**2001a: 5) **makes a more general point** on business school approaches that transpose corporate strategy to the national level: **“they often describe what they regard as the (sensible) constituent elements of competitive success (innovation, skills, clusters) without grounding it in theories of markets, market failures and the ability of government to overcome these failures.”** Finally, **the use of a concept of competitiveness itself has been attacked, criticisms ranging from it being ‘ambiguous’ due to lack of rigorous definition in the early economics literature** (Siggel, 2006), **to it being fundamentally ‘misguided and damaging’** (Krugman, 1994). **Krugman’s** (1994, 1996, 1998) **damning dismissal has been particularly widely cited.** However, his strongly-worded call to recognise that “**the obsession with competitiveness is both wrong and dangerous”** (1994: 44) has neither stemmed the flow of analysis nor put an end to the controversy over its meaning and use. **Schoenberger** (1998: 3) has since argued that competitiveness has “become truly hegemonic in the Gramscian sense.” In line with some of Krugman’s concerns over the misuse of the concept, she **questions whether we can be “sure that the desired objectivity of our research is not subtly undermined by our reliance on a language and a discourse that is not entirely of our own choosing and, arguably, is a language and a discourse that represents the interests of particular social groups and not others?”** (ibid.: 13). Such apprehension is echoed by Bristow (2005) in a consideration of regional competitiveness. **In particular, she argues that “policy acceptance of the existence and importance of regional competitiveness** and its measurement appe**ars to have run ahead of a number of fundamental theoretical and empirical questions”** (286). Thus, ou**r theoretical understanding of what is meant by competitiveness at a regional scale lags behind its emergence as a “discrete and important policy goal” and the associated proliferation of “indicators by which policy-makers and practitioners can measure, analyse and compare relative competitive performance”** (ibid.: 286).11

**2nc XT: Ocean Exploration Supports Biotech**

**Ocean exploration results in massive biotech advances**

**OECD 12**, Organisation for Economic Co-operation and Development, OECD Global Forum on Biotechnology: Marine Biotechnology – Potential and Challenges, http://www.oecd.org/sti/biotech/oecdglobalforumonbiotechnologymarinebiotechnologypotentialandchallenges.htm

**Recent advances** in science and technology have **increased** our **understanding of the marine environment and the bioresources it contains**. For a long time, our **understanding of marine bioresources was hindered by** the **difficulty of ocean exploration** and by the fact that the vast majority of marine life cannot be easily cultured in the laboratory.  New ’omics tools and related technologies have changed that, enabling analysis of marine biodiversity at the molecular level.  DNA sequencing has been used to access and study unculturable samples and has revealed surprising information about the extent of the diversity and the symbiotic nature of marine organisms.  
The **extreme environments of the marine environment** have **fostered** the **evolution of organisms with unique structures, metabolic pathways, reproductive systems and sensory and defence mechanisms**.  This **biodiversity is likely to be an important source of new materials, feedstock, bioactive compounds, and biological and biochemical systems and processes, yet it remains largely untapped within a dynamic and shared ocean ecosystem.**

**It has massive potential**

**OECD 12**, Organisation for Economic Co-operation and Development, OECD Global Forum on Biotechnology: Marine Biotechnology – Potential and Challenges, http://www.oecd.org/sti/biotech/oecdglobalforumonbiotechnologymarinebiotechnologypotentialandchallenges.htm

**Governments and private sector organisations around the world have begun to recognise the potential of marine biotechnology and are actively working to harness its potential**. However there are several features of the marine environment which may necessitate new policy work to ensure the translation of new scientific and technological advances into economic prosperity in an environmentally sustainable manner.

**2nc XT: Leadership Backfires**

**Countries won’t accept biotech under pressure – only stepping back from U.S. leadership solves**

**Taylor 3**, Michael R. Taylor is a senior fellow at Resources for the Future, Rethinking US leadership in food biotechnology, http://www.nature.com/nbt/journal/v21/n8/full/nbt0803-852.html

**What does this understanding of the public acceptance situation say about the US leadership role? It says most fundamentally that if biotechnology is to achieve its full potential in the world, the U**nited **S**tates **needs to step back from its aggressive advocacy stance and develop a food biotechnology agenda that recognizes that people won't accept food biotechnology under pressure.** They need and deserve to have their questions answered, and the United States should focus on doing what it can to answer them. Here are a few specific things the United States can do.

**2nc XT: Public Backlash Key**

**Winning the PR battle is key to biotech adoption**

**Taylor 3**, Michael R. Taylor is a senior fellow at Resources for the Future, Rethinking US leadership in food biotechnology, http://www.nature.com/nbt/journal/v21/n8/full/nbt0803-852.html

Have food safety and environmental issues been addressed by trusted institutions?

**The U**nited **S**tates' **GM soybeans had the misfortune to debut in Europe in the wake of the UK and European food safety crisis involving mad cow disease.** The same politicians, regulators, and scientists who erroneously said mad cow disease could never pass from cows to humans were telling consumers the soybeans were safe. **The public didn't buy it, and European Union** (Brussels, Belgium) **officials have been struggling ever since to build public confidence in regulatory oversight of GM crops and foods.**

In the United States, food biotechnology has benefited from the traditionally high public trust in the FDA, which has primary jurisdiction over the safety of biotechnology foods. The FDA's reputation as a consumer protection agency is based on its longstanding scientific tradition and its independence from politics, which should be protected. Questions are now being raised about the US biotechnology regulatory system, however, that can be addressed only by the US Congress, such as whether GM foods should be subject to mandatory premarket approval by FDA. Today, they are not. Some in consumer, industry and legislative circles think they should be, if only to maintain public confidence in the technology.

The potential environmental issues surrounding GM crops tend to be more complex and uncertain scientifically than the food safety issues, and the US National Academy of Sciences (Washington, DC, USA) and other groups have recommended enhancement of how the US regulatory system handles them. The public resonance of environmental issues was demonstrated by the uproar that ensued when questions were raised a few years ago about the possible threat of GM crops to the Monarch butterfly.

In Africa, **credible regulation of GM crops and foods will be as important to acceptance of biotechnology** as it is in Europe and the United States. As demonstrated by the recent experience with GM food aid in Zambia, Africans will make their own decisions about biotechnology, including whether GM crops and foods meet local safety standards. Zambia and other African nations are actively developing regulatory systems for biotechnology, but their progress requires building scientific and institutional capacities that are in short supply today. It is unrealistic to expect public acceptance in Africa until these capacities are in place.

**Otherwise other countries will ban GMOs**

**Taylor 3**, Michael R. Taylor is a senior fellow at Resources for the Future, Rethinking US leadership in food biotechnology, http://www.nature.com/nbt/journal/v21/n8/full/nbt0803-852.html

The choice issue takes a different form, too, in Africa. **African farmers and consumers will accept biotechnology based on their decision that it is good for them, not because it is good for someone else** and not when it is controlled by others and offered as the only option. The **reluctance to have the technology imposed was at least one factor in the Zambian decision last year initially to reject GM food aid from the U**nited **S**tates. The Zambians had other options for meeting their dire food needs and chose not to accept GM corn under pressure and under someone else's conditions.

**2nc Uniqueness --- Biotech Decline**

**Lack of innovation is devastating the biotech industry now**

**Moon 14**, Angela is a staff writer at the New York Times, 3/21/14, http://www.reuters.com/article/2014/03/21/us-biotech-stocks-options-idUSBREA2K20020140321

(Reuters) - **Biotech**nology **stocks suffered their worst day since October 2011** on Friday, **raising questions among investors whether the sector is finally running out of momentum.**

**The biotech industry is in free fall now**

**Blaine 4/8**, Claire Blaine is a staff writer at Benzinga, a news outlet focused on the financial markets, http://www.benzinga.com/news/14/04/4454025/biotechs-struggling-to-find-a-bottom

**The great biotechnology sell-off of 2014 began** on February 26 and started as big sell-offs often do: quietly. The SPDR S&P Biotechnology exchange-traded fund (NYSE: XBI [FREE Stock Trend Analysis]) peaked at $172.52 and closed at $170.01, off 40 cents from the day before. The next day, the ETF finished at a record close of $170.66 but dropped pretty consistently thereafter. Between February 25 and Monday, the ETF had suffered losses on 20 of 29 days -- and had dropped 22.8 percent in the process. **It's been a shocking decline, but should not have surprised anyone**. The ETF had risen 48 percent in 2012 and added an additional 31 percent in 2014 before the blow-off erupted. See also: Despite S&P 500's New High, Stocks Face Challenges Since the selling took hold, **the slump has battered biotechs of all sizes**. Share prices fell steadily through March and into April. It's not clear if the selling is over, although shares of a number of large biotech companies rebounded on Monday, including Gilead Sciences (NASDAQ: GILD), Celgene Corp. (NASDAQ: CELG), Biogen Idec (NASDAQ: BIIB) and Regeneron Pharmaceuticals (NASDAQ: REGN). One issue that's pressuring the stocks is the big wave of biotech initial public offerings. Some 45 percent of all IPOs that went to market in the first quarter were biotech companies. Lots of Biotech IPOs Of these, none was actually making money; half had no revenue at all. But, The New York Times noted, the companies were valued at a median of $199 million. "In social media and biotech, **a lot of companies seem to be based on hopes and dreams, not revenue or earnings**," **Jay Ritter, a University of Florida business professor told The Times**. The calendar of biotech IPOs is still strong, with three set to go to market this week alone. And Yarol Werber, a Citigroup analyst, says 2014 will be the best year for biotech IPOs since 2000. Price Gouging Perception Issue A second problem is really a PR problem -- but a serious PR problem. It came on March 21 when members of Congress asked Gilead Sciences to explain why it was pricing Sovaldi, its drug for Hepatitis C, at $84,000 for a 12-week course. A number of health insurers, including Medicaid, have balked at the price. There's nothing wrong with Sovaldi as a drug. It has delivered terrific results in curing patients with the disease. But the prices in the United States have produced extreme sticker shock. Gilead devised a tiered pricing schedule, based on a country's per capita gross national income. So, it has been selling the drug for as little as $900 in Egypt for a 12-week course. In Germany, the price is $66,000, and it's $57,000 in the United Kingdom. The stock fell nearly five percent that day, and the selling affected other drug makers as well. Gilead shares, however, were already falling rapidly. From an intraday peak of $84.88 on February 25, the shares fell as much as 20 percent through March 28. They've recovered somewhat to $72.23. Gilead has been one of biotech's high fliers: If you'd been smart enough to buy Gilead at the end of 2010, your investment would be up nearly 300 percent despite the pullback. Skittish Investors A third problem seems to be **that a lot of investors know little about biotechs, especially young biotechs, and panic at the first whiff of trouble**.

**2nc Uniqueness --- Biotech Leadership Decline**

**Biotech leadership’s declining**

**ITIF 12**, The Information Technology & Innovation Foundation, Leadership in Decline: Assessing U.S. International Competitiveness in Biomedical Research, http://www.itif.org/publications/leadership-decline-assessing-us-international-competitiveness-biomedical-research

This public investment laid the foundation for the development of scores of breakthrough pharmaceutical drugs and therapies—from personalized gene therapies to synthetic skin to cures for certain types of cancer—and has catalyzed the development of a globally competitive, high-wage life sciences industry in the United States. Today, the U.S. life sciences industry supports more than 7 million jobs and contributes $69 billion annually to U.S. gross domestic product (GDP). But **U.S. leadership in the global life sciences industry is today under threat** on two fronts. First, **federal investment in biomedical research** through NIH has **decreased**, both in inflation-adjusted dollars and as a share of GDP, nearly every year since 2003. Put simply, **the U**nited **S**tates **is not sustaining the historically strong investment in biomedical research that once propelled it to global life sciences leadership.**

**Aff**

**2ac Non-Unique --- Biotech Leadership**

**The U.S. has strong biotech leadership now**

**DoC 14**, U.S. Department of Commerce, The Pharmaceutical and Biotech Industries in the United States, http://selectusa.commerce.gov/industry-snapshots/pharmaceutical-and-biotech-industries-united-states

**The U**nited **S**tates **is the world’s largest market for pharmaceuticals and the world leader in biopharmaceutical research.**  According to the Pharmaceutical Research and Manufacturers Association (PhRMA), **U.S. firms conduct the majority of the world’s r**esearch **and d**evelopment in pharmaceuticals **and hold the intellectual property rights on most new medicines.  The biopharmaceutical pipeline also has over 5,000 new medicines currently in development around the world with approximately 3,400 compounds currently being studied in the U**nited **S**tates - **more than** in **any other region around the world.**

**1ar XT: Non-Unique --- Biotech Leadership**

**Industry growth will continue**

**DoC 14**, U.S. Department of Commerce, The Pharmaceutical and Biotech Industries in the United States, http://selectusa.commerce.gov/industry-snapshots/pharmaceutical-and-biotech-industries-united-states

**The markets for biologics**, over-the-counter (OTC) medicines, and generics **show the most potential for growth and have become increasingly competitive. Biologics account for a quarter of all new drugs in** clinical **trials** or awaiting U.S. Food and Drug Administration approval. OTC **market growth will be driven by a growing aging population and consumer trend** to self-medication, and the conversion of drugs from prescription to non-prescription or OTC status.

**Our leadership is overwhelming**

**BioWorld 13**, U.S. Maintains Leadership in Global Biotech Rankings, http://www.bioworld.com/content/us-maintains-leadership-global-biotech-rankings

**By any measurement the U.S. biotechnology industry is the envy of the world**. **Perspectives on** the reasons for **the nation's dominance in this sector are provided by the latest Scientific American Worldview Scorecard, which for the past five years has been ranking countries on their global competitiveness in biotech**nology. The 2013 edition reflects increased global competition and a growing list of countries being added to the rankings.

**---1ar AT: Government R&D Cuts**

**Government research cuts are irrelevant – the private sector spearheads research**

**DoC 14**, U.S. Department of Commerce, The Pharmaceutical and Biotech Industries in the United States, http://selectusa.commerce.gov/industry-snapshots/pharmaceutical-and-biotech-industries-united-states

The biopharmaceutical industry produces medical drugs derived from life forms (biologics). These include proteins (including antibodies), and nucleic acids (DNA, RNA or antisense oligonucleotides) used for therapeutic or in vivo diagnostic purposes, and are produced by means other than direct extraction from a native (non-engineered) biological source. A potentially controversial method of producing biopharmaceuticals involves transgenic organisms, particularly plants and animals that have been genetically modified to produce drugs. **The biopharmaceutical industry relies heavily on research performed by small companies and academic institutions that is either acquired by large companies that can bring the products to commercialization, or independently financed.**

**2ac Biotech Leadership Good --- Competitiveness**

**Biotech solves economic competitiveness**

**Chase-Dunn and Reifer 2**, professor at University of California Riverside, and Reifer, professor University of California Riverside, 2002

(Chris and Thomas, The Institute for Research on World-Systems, “U.S. Hegemony and Biotechnology: The geopolitics of new lead technology,” http://repositories.cdlib.org/irows/irows9/, RG)

**Biotechnology has been heralded as the potential basis for a new round of U.S. economic hegemony**. In this discussion we will need to use a distinction between medical biotechnology and agricultural biotechnology because of the somewhat different ways in which these branches of the application of applied biology are related to factors that may influence the economic potential of these technologies. Agricultural biotechnology is the application of genomics to create new crops, new sources of animal protein, and to protect crops and domesticated animals from pests. **Agricultural biotechnology is intended to improve the human food supply by lowering the costs of production and by improving the products. Medical biotechnology is intended to improve human health by developing new techniques for preventing diseases**, curing ailments, producing products for transplants and improving the genetic makeup of individuals. An important literature has emerged that discusses the ethical dimensions and political implications of biotechnology (e.g. Shiva 1997; Rifkin 1998) . Extremely fundamental issues are becoming important in public discourse, and the governance of biotechnology research and applications will be an increasingly central part of politics in the twenty-first century (e.g. Fukuyama 2002). In this paper we will discuss the politics of biotechnology only insofar as it is likely to be an important influence on the potential role of **biotechnology** as a new lead industry that **might function as the basis of a new round of U.S. economic hegemony**. In order for biotechnology to function as a new lead industry that could serve as a basis for a new round of U.S. economic hegemony several conditions would have to be met. **Investments in biotechnology would have to produce products that can be profitably sold, and these would need to be purchased within the U**nited **S**tates **and in the world market.** Firms producing these biotechnology products would need to be able to obtain technological rents over a period of time long enough to recoup the costs of research and development. And the biotechnology industry would need to serve as a source of spin-offs for the rest of the U.S. economy to a degree greater than in the national economies of contending core powers. Figure 4 illustrates our contentions about factors that will reduce the likelihood of the biotechnology industry serving as a basis for a new round of U.S. hegemony. We note that the huge decreases in transportation costs and communications costs in the most recent wave of globalization have increased the rate at which technologies and new industries can spread to competing regions. It has been thought that **the research and development costs of the biotech industry make it difficult for new centers to emerge, and this has been alleged to be part of the basis for the U.S. lead in biotechnology**. It is true that the U.S. research universities and publicly funded research have been important sources of both medical and agricultural biotechnological advances. The U.S. Department of Agriculture and federal agricultural policies played a central role in the development of agricultural biotechnology (Kloppenburg 1988a, 1988b; Pistorius and van Wijk1999). And the United States has taken the lead in the creation of an international patent regime to protect “intellectual property”(the so-called TRIPS agreement) that should, in principle, allow firms to recoup research and development costs through technological rents. **The allegedly high start-up costs should prevent the early emergence of competitors, and this has been claimed to account for how biotechnology research and development and commercialization in Europe and Japan have lagged behind the U.S.**

**Great power war**

**Baru 9 –** Sanjaya Baru is a Professor at the Lee Kuan Yew School in Singapore Geopolitical Implications of the Current Global Financial Crisis, Strategic Analysis, Volume 33, Issue 2 March 2009 , pages 163 – 168

Hence, economic policies and performance do have strategic consequences.2 In the modern era, the idea that **strong economic performance is the foundation of power** was argued most persuasively by historian Paul Kennedy. 'Victory (in war)', Kennedy claimed, 'has repeatedly gone to the side with more flourishing productive base'.3 **Drawing attention to** the **interrelationships between** economic **wealth, technological innovation, and the ability of states to efficiently mobilize economic and technological resources for power projection** and national defence, Kennedy argued that nations that were able to better combine military and economic strength scored over others. 'The fact remains', Kennedy argued, 'that all of the **major shifts in** the world's **military-power balance** have **followed alterations in** the **productive balances**; and further, that **the rising and falling of the various empires** and states in the international system **has been confirmed by** the outcomes of the **major Great Power wars**, where victory has always gone to the side with the greatest material resources'.4 In Kennedy's view, the **geopolitical consequences of** an economic crisis, or even **decline, would be** transmitted through a nation's **inability to** find adequate financial resources to simultaneously **sustain** economic growth and **military power**, the classic 'guns versus butter' dilemma.

**1ar XT: Key to Competitiveness**

**It’s key to economic competitiveness – otherwise cascading losses are inevitable**

**Cummings 12**, Deborah Cummings is a senior program manager with Battelle, What will it take for the U.S. to maintain its global leadership in the biopharmaceutical industry?, http://www.biotech-now.org/business-and-investments/2012/10/what-will-it-take-for-the-u-s-to-maintain-its-global-leadership-in-the-biopharmaceutical-industry#

**The biopharmaceutical industry is an important contributor to U.S. economic growth and sustainability, with more than 650,000 direct jobs (supporting a total of nearly 4 million jobs) and an economic output that totals more than $900 billion**.[i] **This significant economic impact is due to the high value-added nature of the sector, its extensive supply chain relationships, and high-wage jobs.** As a result, **gains and losses in the biopharmaceutical sector cascade across many important economic sectors in the U.S.**

**2ac AT: Amazon**

**Squo solves Amazon deforestation**

**RTCC 6/16**, Responding to Climate Change, **Brazil achieves 70% reduction in Amazon deforestation**, http://www.rtcc.org/2014/06/16/brazil-achieves-70-reduction-in-amazon-deforestation/

Brazil might or might not win the World Cup, but it so far seems a clear winner in the race to reduce carbon emissions, having stopped 3.2 billion tons of carbon dioxide from escaping into the atmosphere during the last decade.

**A team of economists and scientists report in the US journal Science that Brazil has achieved this, since 2004, by** simply **not cutting down 86,000 square kilometres of rainforest. This is**, in effect, **a 70% decline in deforestation, and in 2013 alone such abstention amounted to a 1.5% drop in global carbon emissions.**

**2ac AT: Bioterror**

**No impact to bioterror**

**Mueller 10** [John, Woody Hayes Chair of National Security Studies at the Mershon Center for International Security Studies and a Professor of Political Science at The Ohio State University, A.B. from the University of Chicago, M.A. and Ph.D. @ UCLA, Atomic Obsession – Nuclear Alarmism from Hiroshima to Al-Qaeda, Oxford University Press]

**Properly developed and deployed, biological weapons could potentially, if thus far only in theory, kill hundreds of thousands,** perhaps even millions, of people. **The discussion remains theoretical because biological weapons have scarcely ever been used. For the most destructive results, they need to be dispersed in very low-altitude aerosol clouds. Since aerosols do not appreciably settle, pathogens like anthrax** (which is not easy to spread or catch and is not contagious) would probably **have to be sprayed near nose level.** Moreover, **90 percent of the microorganisms are likely to die during the process of aerosolization, while their effectiveness could be reduced still further by sunlight, smog, humidity, and temperature changes. Explosive methods of dispersion may destroy the organisms, and, except for anthrax spores, long-term storage of lethal organisms in bombs or warheads is difficult: even if refrigerated, most of the organisms have a limited lifetime. Such weapons can take days or weeks to have full effect, during which time** **they can be countered with medical and civil defense measures.** In the summary judgment of two careful analysts, **delivering microbes and toxins over a wide area in the form most suitable for inflicting mass casualties-as an aerosol that could be inhaled-requires a delivery system of enormous sophistication, and even then** **effective dispersal could easily be disrupted by unfavorable environmental and meteorological conditions.**

**2ac AT: Food**

**Check aquaculture neg**